REMARKS

Claims 1-8, 10-18, and 22-30 are pending in this application. Claims 9, 19-21, and 27 have been cancelled. By this Amendment, claims 1-4, 7, 8, 13-16, 25, 26, 28, and 29 have been amended and claim 30 has been added.

In the Office Action, the Examiner objected to the Title; rejected claims 9 and 21 under 35 U.S.C. § 112, second paragraph; rejected claims 1, 2, 6, 10, 11, and 25 under 35 U.S.C. § 103(a) citing Kajiyama et al., PCT Publication WO 98-19303, Kashiwagi et al., U.S. Patent 6,003,336, Hibino et al., U.S. Patent 6,119,485, and Takanobu, Japanese Published Application No. 11-268920; rejected claims 3-5 under 35 U.S.C. § 103(a) citing Kajiyama, Kashiwagi, Hibino, Takanobu, and Inoue et al., U.S. Patent 5,759,457; rejected claims 7 and 8 under 35 U.S.C. § 103(a) citing Kajiyama, Kashiwagi, Hibino, Takanobu, and Sato et al., U.S. Patent No. 5,181,141; rejected claims 13-18 and 22 under 35 U.S.C. § 103(a) citing Inoue, Takanobu, Kashiwagi, and Hibino; rejected claims 19 and 20 under 35 U.S.C. § 103(a) citing Takanobu, Kashiwagi, Hibino, and Sato; rejected claims 23 and 24 under 35 U.S.C. § 103(a) citing Takanobu, Kashiwagi, and Hibino; rejected claim 26 under 35 U.S.C. § 102 as anticipated by Takanobu, Hibino, or Kashiwagi; rejected claim 27 under 35 U.S.C. § 103(a) citing Takanobu, Hibino, Kashiwagi, and Inoue; rejected claim 28 under 35 U.S.C. § 103(a) citing Takanobu, Hibino, Kashiwagi, and Yamagata et al., PCT Publication WO 00/17691; and rejected claim 29 under 35 U.S.C. § 103(a) citing Takanobu, Hibino, Kashiwagi, and Yamagata.

By this Amendment, Applicants have inserted a new title.

By this Amendment, Applicants have cancelled claims 9 and 21. The rejection under 35 U.S.C. § 112, second paragraph is therefore moot.

Applicants respectfully traverse the Examiner's rejections under 35 U.S.C. §§ 102 and 103(a) and respectfully submit that the pending claims are distinguishable over the prior art cited by the Examiner for at least the reasons discussed below.

Conventional CD readers employ a light source emitting light of a wavelength of about 780 nm, while DVD readers employ a light source emitting light with a wavelength of about 650 nm. In contrast, the next generation of optical media readers are expected to employ light sources emitting light having wavelengths of less than 500 nm. As shown in Table 1 on page 3 of the present application, Rayleigh scattering suddenly increases as the wavelength of light decreases to 500 nm or less. In the next generation optical readers, as the light wavelength becomes 500 nm or less, the optical elements become more important. In particular, the surface roughness of the optical element influences the performance of reading and recording information from and to an optical recording medium. The present inventors recognized and responded to this influence.

Independent claim 1 recites an optical pickup device for recording and/or reproducing information in an optical information recording medium. The device includes a light source emitting light flux having a central wavelength not more than 500 nm, a converging optical system, and an optical detector. The converging optical system or the optical detector comprises at least one optical element, and that optical element comprises at least one optical surface having a center-line mean roughness Ra not more than 5 nm.

As apparently recognized by the Examiner, none of Kashiwagi, Hibino, or Takanobu disclose a "central wavelength not more than 500 nm", while Kajiyama does

not disclose an "Ra not more than 5 nm". Applicants respectfully submit that the Examiner has not shown the required motivation to use an optical element having a surface roughness Ra not more than 5 nm in an optical pickup device having a light source to emit light flux having a central wavelength not more than 500 nm. These cited references fail to recognize or suggest the critical relationship between the surface roughness and decreasing wavelength as set forth in the present specification.

Amended claim 13 combines original claim 13 with dependent claim 20 and recites an optical element comprising at least one optical surface. The optical surface has a center-line mean roughness Ra not more than 5 nm and at least one surface of the optical surface of the optical element has a reflectance not more than 3% for light having at least a wavelength of 300 nm to 500 nm.

Applicants respectfully submit that none of the prior art cited by the Examiner teaches or suggests the claimed combination including, but not limited to, a surface roughness Ra not more than 5 nm and a reflectance not more than 3% for light having at least a wavelength of 300 nm to 500 nm. As discussed above, none of the prior art references cited by the Examiner teach or suggest the claimed combination of surface roughness and wavelength. In addition, while the Examiner relies upon Sato as disclosing the relationship between reflectance and wavelength, Sato fails to disclose or mention surface roughness. Indeed, Sato discloses a multi-layered anti-reflection film directly or indirectly on an optical component and thus teaches away from the other references cited by the Examiner.

Independent claim 25 recites an optical information recording and/or reproducing apparatus for recording and/or reproducing information in an optical information

recording medium. The optical pickup device includes a light source emitting light flux having a central wavelength not more than 500 nm, a converging optical system, and an optical detector. The converging optical system or the optical detector comprises at least one optical element, and that optical element comprises at least one optical surface having a center-line mean roughness Ra not more than 5 nm.

As explained for independent claim 1, the cited prior art fails to teach or suggest the combination of elements recited in independent claim 25.

Amended claim 26 combines and claim 26 and dependent claim 27 and recites a molding die for an optical element. The molding die comprises at least one aspherical surface having a center-line mean roughness Ra of not more than 5 nm. Although the Examiner relies upon Inoue as teaching an aspherical objective lens die, Inoue fails to disclose the claimed surface roughness. Applicants respectfully submit that the claimed combination of surface roughness and an aspherical surface would not have been obvious to one of ordinary skill in the art.

Claim 28 recites a method of manufacturing a molding die for an optical element. The method comprises the steps of cutting a material of the molding die with a super precision lathe and a diamond tool and forming an optical surface transferring surface in the molding die. The optical surface transferring surface comprises at least one surface having a center-line mean roughness Ra not more than 5 nm.

Applicants respectfully submit that the prior art cited by the Examiner fails to teach, disclose, or suggest the method recited in independent claim 28. The Examiner relies on Yamagata as disclosing a "diamond tool", but apparently admits that Yamagata does not disclose an "Ra of 5 nm or less." In addition, while Kashiwagi

discloses a diamond tool (col. 6, lines 7-9), Kashiwagi, according to Applicants, fails to disclose a super precision lathe or the combination of a super precision lathe and a center-line mean roughness Ra not more than 5 nm.

New independent claim 30 recites an optical element comprising an optical surface. The optical surface has a center-line mean roughness Ra not more than 5 nm and a reflectance not more than 5% for light having a wavelength of 400 nm. Applicants respectfully submit that new claim 30 is patentable at least for the same reasons discussed for claim 13.

While not specifically discussed above, dependent claims 2-8, 10-12, 14-18, 22-24, and 29 are patentable for at least the same reasons as independent claims 1, 13, 25, 26, 28, and 29, as well as for the additional limitations and combinations recited within those dependent claims.

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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